STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
Jeremiah W. (Jay) Nixon, Governor • Mark N. Templeton, Director
www.dnr.mo.gov

April 30, 2010

Mr. Paul Rosasco, P.E.
Engineering Management Support, Inc.
7220 West Jefferson Avenue, Suite 406
Lakewood, CO 80235

RE: Comments on Draft Revision 1 - Work Plan for Supplemental Feasibility Study
West Lake Landfill Operable Unit 1, Bridgeton, Missouri

Dear Mr. Rosasco:

The Missouri Department of Natural Resources has completed its review of the above referenced document prepared by Engineering Management Support Inc. (EMSI), and is transmitting the enclosed final comments. These comments have been compiled by the Department's Hazardous Waste Program, Federal Facilities Section with assistance from other programs within the Department and other State agencies.

Overall, the Department does not agree with some of the conclusions drawn in this work plan, as outlined in the attached comments. However, for the purposes of this Supplemental Feasibility Study, the conclusions and objectives of the work plan may be used to compare the additional alternatives to the current selected remedy in order to make an informed decision on the path forward for West Lake Landfill.

Thank you for giving us the opportunity to review and comment on this document. If you have any questions pertaining to these comments please contact me by phone at (573)751-3107, or by written correspondence at P.O. Box 176, Jefferson City, MO 65102.

Sincerely,

HAZARDOUS WASTE PROGRAM

Shawn Muenks

Shawn Muenks, P.E.
Federal Facilities Section

SM:dd

c: Mr. Dan Gravatt, U.S. Environmental Protection Agency

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Comments on the
West Lake Landfill Operable Unit 1
Draft Revision 1 - Work Plan for Supplemental Feasibility Study

GENERAL COMMENTS:

1. **Applicable or Relevant and Appropriate Requirements (ARARs)**
Section 2.1.1 states that "the standards established under 40 CFR 192 Subpart B [UMTRCA] are neither applicable nor relevant and appropriate to the solid waste landfill areas at the West Lake site" (last paragraph on page 6). While the Department does not necessarily disagree with use of these standards for the purpose of this Supplemental Feasibility Study, the Department does not agree with this ARAR conclusion. The U.S.EPA determined in the Record of Decision (ROD) that the UMTRCA soil cleanup standards were not applicable but were relevant and appropriate to cleanup of soil containing radionuclides at the Buffer Zone/Crossroads properties. The work plan states that "these standards are not considered to be relevant and appropriate as they do not address conditions that are sufficiently similar to the West Lake Landfill." The Department does not agree with this unsupported assumption, given the lack of data on the nature of material in the landfill. It is recommended that the UMTRCA standards be considered as a possible ARAR for the solid waste landfill areas until such data is collected that proves otherwise. The Department understands the use of the UMTRCA standards for this study until a more definitive ARAR conclusion can be made.

   The use of UMTRCA standards should also be supported by determination on whether the cleanup standards are protective of public health as part of the Threshold Criteria. It is recommended that RESRAD be utilized to develop an estimated dose and risk on and off-site using the UMTRCA cleanup standards, as well as derived concentration guideline levels (DCGLS). This should include evaluation of both residential and leaching to groundwater pathways. It is recommended that the International Commission on Radiological Protection (ICRP) Publication 72 dose conversion factors be used.

2. **Cleanup Levels for Uranium**
Section 2.1.2 Evaluation of Soil Cleanup Levels for "complete rad removal" references 81 pCi/g as the remedial goal for U-238, which was used as a surrogate for total uranium in the St. Louis Airport Site (SLAPS) ROD. This value was then revised downward to 50 pCi/g to account for Protactinium-231 and Actinium-227 concentrations above secular equilibrium. For this Supplemental FS, please provide the risk calculations used to derive this cleanup value. In addition, along with the risk calculations; please include discussion on how U-235 series decay radionuclide concentrations will be addressed, including Protactinium-231 and Actinium-227.

   Also, it is our understanding that the cleanup value for uranium was calculated for carcinogenic risk only. OSWER Directive 9200.4-18, Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination, requires that radiological and non-radiological risk be additive. Please provide clarification on how the non-carcinogenic risk from exposure to uranium will be addressed.

3. **Preliminary Remediation Goals**
The EPA Risk Assessment Guidance for Superfund, Volume I – Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals), Interim, December 1991, provides guidance on using EPA toxicity values and exposure information to derive risk-based preliminary remediation goals (PRGs) in order to provide long-term targets to use during analysis and selection of remedial alternatives. This work plan discusses cleanup levels but does not mention development of PRGs. Please identify how PRGs will be used during this study.

4. **Baseline Risk Assessment**
The use of risk calculations from the Baseline Risk Assessment to justify cleanup values as described in Section 2.1.2 is not recommended for the following reasons.
   a. The document was developed in 2000, which may not include current modeling for assessing dose and risk from exposure to radionuclides.
   b. The exposure scenarios used to assess dose/risk for future on-site workers are not representative of the "complete rad removal" scenario. Therefore, the calculations provided on Page 8 of the work plan are not representative of potential risks associated with UMTRCA.
   c. Using a 300 fold reduction factor in radiological concentrations under the "complete rad removal" scenario to quantify a maximum projected risk level is not considered a valid risk calculation.

   If risk levels are needed to justify the cleanup levels set forth in UMTRCA regulations, a site-specific risk assessment using current risk-based input values should be conducted.

5. **Background Concentrations**
The Department has reservations about using mean + 2 sigma as background concentrations versus using just the mean (see comment #17 from previous MDNR comments). Also, using only 4 background samples is questionable. Guidance for obtaining the appropriate number of samples can be obtained using MARSSIM. Data quality objectives that address collection of additional sampling for background should be included in the SFS. Additional background samples should be selected from areas with similar physical, chemical, geological, radiological, and biological characteristics as the survey unit being evaluated as instructed by MARSSIM.

6. **Radon Migration Offsite (repeat of MDNR Comment #7 from previous comments)**
The work plan needs more discussion on how radon generation will increase as part of the decay series and how off-site migration will be monitored and controlled. Migration of thorium-230 and radium-226 series in soils and groundwater is necessary in order to assess potential exposure to radon pathway in buildings. Please discuss how offsite exposure to radon gas from migration of radium and thorium will be addressed.

7. **Sum of Ratios (repeat of MDNR Comment #8 from first previous comments)**
The revised work plan did not contain dialogue on the sum of ratios for computation of radiological cleanup levels. MDNR supports the use of this method. Please include discussion on the applicability of this approach.

8. **Modeling Approaches**
The department is unfamiliar with some of the modeling software and methods presented in the work plan. In particular, Section 2.11 specifies the use of Microshield® software to calculate exposure rates from radiologically-impacted materials to the selected short-term receptors and the method described in NUREG/CR-3533 (NRC, 1984) to estimate radon emanation from soil concentrations of radium-226. Please provide reference to sources that can be used to learn more about these modeling tools.